

## P4.32 Archaeal ammonium-oxidizers and nirS-type denitrifiers dominate the rhizosphere of leguminous trees in Brazilian semiarid soils

Rodrigo Gouvêa Taketani, Milena Duarte Lançon, Vanessa Nessner Kavamura  
and Itamar Soares de Melo

Laboratory of Environmental Microbiology, EMBRAPA Environment, Jaguariúna-SP,  
Rodovia SP 340 km 127,5, CEP 13820-000, Brazil

Corresponding mail: Rodrigo Gouvêa Taketani, [rgtaketani@yahoo.com.br](mailto:rgtaketani@yahoo.com.br)

The semi-arid biome known as Caatinga covers 9.8% of the Brazilian territory, with an area of 841.261km<sup>2</sup>. In this region the annual amount of rain is usually around 500-800 mm year<sup>-1</sup> irregularly distributed throughout the year. Hence, life in this biome has been selected to withstand long periods of drought (that can last up to 12 months). Another important characteristic of this environment is its critically low nitrogen content due to the high percentage of sand in these soils. These features lead to a dominance of plants that can form interactions with nitrogen fixing microorganisms such as leguminous trees. Hence, the abundance of plant species in this environment regardless of this constrains. In this context, the knowledge about the microorganisms that inhabit this biome is crucial, due to their role on organic matter decomposition, primary production and nutrient cycling. Therefore, the aim of this study is to evaluate the key microbial guilds that are responsible for the nitrification and denitrification in the rhizosphere of the most abundant and widespread leguminous trees in the Brazilian semiarid biome (the Caatinga). Thus we sampled the rhizosphere of three *Mimosa tenuiflora* and *Senegalia langsdorffii* adult trees (spread over 300 m<sup>3</sup> on average) on six different sites and evaluated using Real-time PCR the amoA of archaea (AOA) and bacteria (AOB), nirS and nirK genes. The ammonium-oxidizing guild was formed mainly by archaea that corresponded to 60% of the total amoA copy numbers. The AOA and AOB abundance was about 20.0% higher in *M. tenuiflora* samples. It could be noticed that there was a spatial effect on the abundance of ammonium-oxidizing communities. Additionally, abundance of nirS genes was more than ten fold that of nirK. As was observed for the AOA and AOB the abundance of denitrifiers was 85% higher in *M. tenuiflora*. In conclusion, the rhizosphere of two of the most abundant and widespread leguminous trees in the Brazilian semiarid was dominated by archeal ammonium-oxidizers and nirS type denitrifiers and their abundance was regulated by tree species and sampling site.